

CHAPTER 1

Introduction

In the Lower West Coast (LWC) Planning Area, the population is projected to increase by 74 percent from Year 2005 to about 1.6 million by Year 2025. Traditional fresh groundwater and surface water supplies were shown more than a decade ago to be inadequate to meet much of the projected new demand for the region, and this has resulted in extensive development of alternative water sources. Meeting the updated water supply and demand projections for the current 20-year planning horizon will require a continued focus primarily on nontraditional water supply solutions. This *2005–2006 Lower West Coast Water Supply Plan Update* (LWC Plan Update) supports the *2000 Lower West Coast Water Supply Plan's* (LWC Plan) findings and recommendations, which call for development of alternative water sources to meet most of the region's new water supply needs.

Working closely with the South Florida Water Management District (SFWMD or District), local governments and water suppliers play a key role in identifying the water supply projects that have been or will be incorporated into their local comprehensive plans. This 2005–2006 LWC Plan Update describes and meets current statutory requirements, including a listing of proposed alternative water supply projects and regional project implementation strategies for planners, policy makers and utility directors.

The 2005–2006 LWC Plan Update consists of this Planning Document and Appendices. In addition, the accompanying CD contains electronic versions of this update package, as well as the *Consolidated Water Supply Plan Support Document*, supporting studies, documentation, data and the previous 2000 LWC Plan. This material is also available from the District's Water Supply Plan Web site at: <http://www.sfwmd.gov/org/wsd/wsp>.

PURPOSE

This 2005–2006 LWC Plan Update addresses the anticipated water supply needs of the LWC Planning Area for the next 20 years and how those needs will be met. Although some traditional supply development may be possible given appropriate local conditions, the majority of new water needs will be met through the development and funding of alternative water supplies. In addition, this LWC Plan Update contains a list of alternative water supply projects for Fiscal Years 2006–2025. The alternative water supply projects listed in this plan are eligible for cost-sharing consideration through a separate annual funding process that is established by the SFWMD Governing Board consistent with statutory requirements.

Florida Water Law

Section 373.0361(1), Florida Statutes (F.S.), The governing board of each water management district shall conduct water supply planning for any water supply planning region within the district identified in the appropriate district water supply plan under Section 373.036, where it determines that existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period.

The legal authority and requirements for water supply planning are included in Chapters 373, 403 and 187 of the Florida Statutes. During the State of Florida's 2005 legislative session, lawmakers revised state water law and created the Water Protection and Sustainability Program. The alternative water supply portion of this program is intended to reduce competition between users and natural systems for available water by encouraging the development of alternative water supplies. Chapter 4 of the *Consolidated Water Supply Plan Support Document* (SFWMD 2005–2006) further describes the Water Protection and Sustainability Program.

The new statutory provision strengthens the link between regional water supply plans and the potable water provisions contained within each local government's comprehensive plan. This portion of the law is designed to ensure that adequate potable water facilities are constructed and concurrently available with new development. All local governments within the LWC Planning Area are required to prepare 10-Year Water Supply Facilities Work Plans that identify water supply projects, and adopt revisions to comprehensive plans within 18 months following the approval of this water supply plan update.



Strengthening the Link between Regional Water Supply Planning and Local Government Comprehensive Planning

The Water Protection and Sustainability Program provides annual state revenues and matching District funds to support alternative water supply development, such as construction of desalination, reclaimed water and new storage facilities. This combination of state and District funds is specifically for cost-sharing alternative water supply project construction costs. The program also adds permitting incentives for water providers selecting projects recommended by the water supply plans.

Role of the South Florida Water Management District

The South Florida Water Management District (SFWMD or District) performs water supply planning for each region within its jurisdiction. The District's mission is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems and water supply. The agency serves local governments by supporting efforts to safeguard existing natural resources and meet future water demands.

Regional Water Supply Plans

The SFWMD prepares water supply plans for each of its four planning areas to effectively support planning initiatives and address local issues. The regional water supply plans encompass a minimum 20-year future planning horizon and are updated every five years. Each regional water supply plan update provides revised water demand estimates and projections; an evaluation of existing regional water resources; identification of water supply-related issues; a discussion of present water source options; water resource and water supply development components including funding strategies; and, recommendations for meeting projected demands for the region. In addition, the 2005–2006 LWC Plan Update includes a discussion of minimum flows and levels (MFLs) established within the planning area; MFL recovery and prevention strategies where appropriate; water reservations adopted by rule; technical data; and, support information.

PLAN GOAL AND OBJECTIVES

The SFWMD's strategic goal for all of its water supply planning efforts is to ensure an adequate supply of water to protect natural systems and to meet all existing and projected reasonable-beneficial uses, while sustaining water resources for future generations. Additionally, the goal of the 2005–2006 LWC Plan Update is to identify sufficient sources of water to meet the needs of all reasonable-beneficial uses within the LWC Planning Area (**Figure 1**) for the Year 2025 during a 1-in-10 year drought event, while sustaining the region's water resources and related natural systems.

2005–2006 Lower West Coast Plan Objectives

The SFWMD established the Water Resources Advisory Commission (WRAC) to serve as an advisory body to the Governing Board. The WRAC is the primary forum for conducting workshops, presenting information and receiving public input on water resource issues affecting south Florida. Commission members represent environmental, urban and agricultural interests from all four of the District's water supply planning areas.

The SFWMD held Water Supply Plan WRAC Issue Workshops throughout the water supply planning process. Stakeholders representing a cross-section of interests in the region—agricultural, industrial, environmental protection, utilities, local government

planning departments, and state and federal agencies—attended the workshops. During the workshops, participants reviewed and provided comments for projected demands compiled by District staff. Individual meetings were held with local government planning departments and utilities, as well as agricultural industry representatives to discuss water demand projections and coordinate planning processes.

At regional WRAC Issue Workshops, stakeholders developed the following six objectives for this plan update, which provide an overall framework for the planning process. The objectives were modified from those developed for the 2000 LWC Plan.

Water Supply: Identify sufficient sources of water to meet reasonable-beneficial consumptive uses projected through 2025 under a 1-in-10 year drought event.

Natural Systems: Protect and enhance wetland systems and the water resources from harm due to water use, including drawdowns and harmful movement of saline water.

Estuarine and Riverine Systems: Protect and enhance the estuarine and riverine systems through effective water deliveries and management of the water resources.

Conservation and Alternative Source Development: Encourage conservation measures to improve the efficiency of water use, and support and promote the development of alternative sources.

Linkage with Local Governments: Provide linkage between the LWC Plan Update and local government comprehensive plans.

Compatibility and Linkage with Other Planning Efforts: Achieve compatibility with other related planning activities within the region.

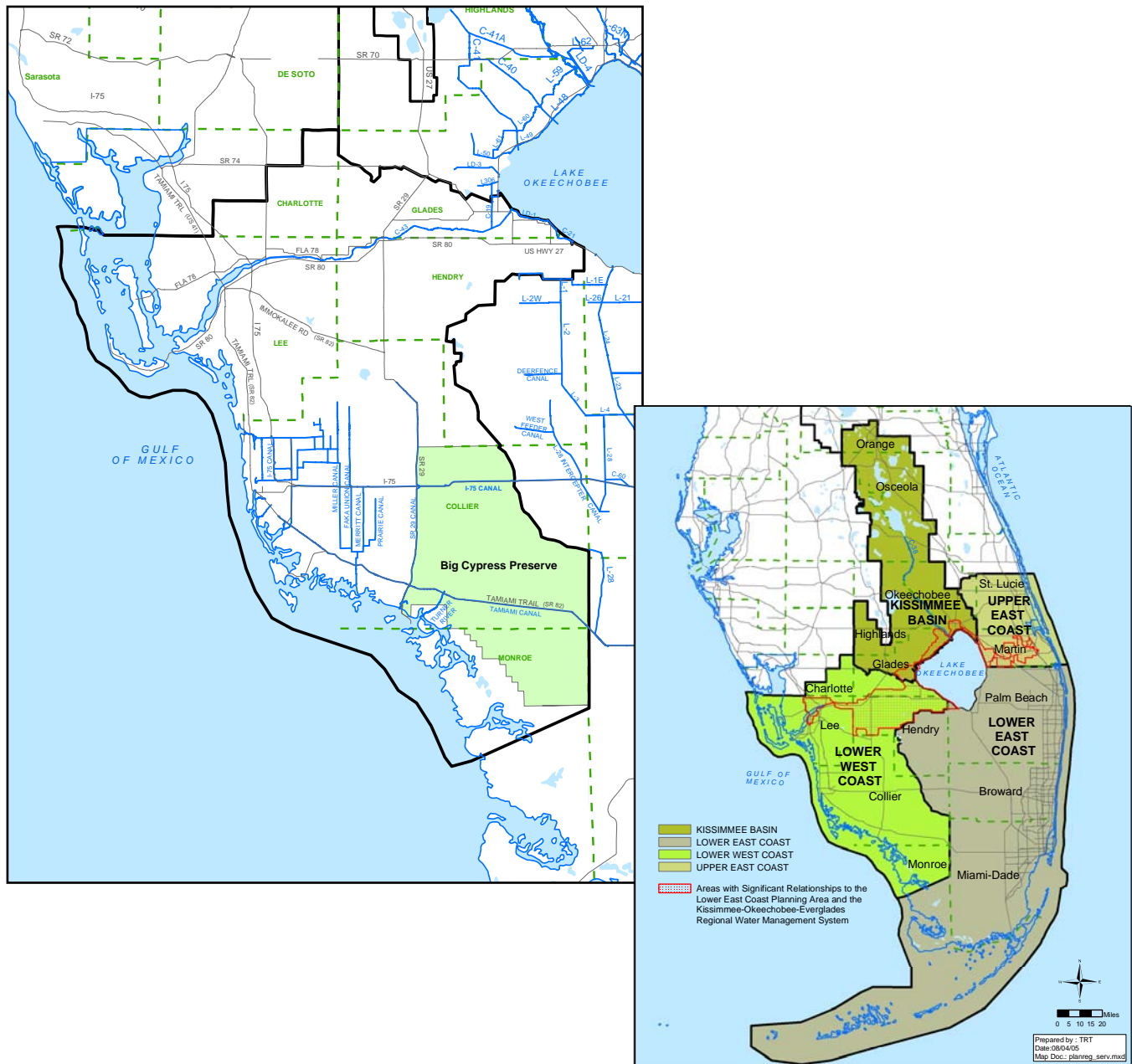


Figure 1. Lower West Coast Water Supply Planning Area.

- LWC Planning Area covers approximately 5,129 square miles.
- Includes all of Lee County, most of Collier and Hendry counties, and portions of Glades, Charlotte and mainland Monroe counties.
- Also includes the Big Cypress Basin, one of two administrative units in the SFWMD with its own board of directors. In the LWC Planning Area, the Big Cypress Basin encompasses all of Collier County and part of Monroe County.
- The LWC Planning Area generally reflects the drainage patterns of the Caloosahatchee River Basin and the Big Cypress Swamp.

- Population is expected to increase from 908,500 in 2005 to about 1.6 million by 2025 (U.S. Bureau of the Census 2001).
- Increased population, and industrial and agricultural operations will result in an increase of about 197 million gallons per day (MGD) in water demand during the next 20 years, most of which will come from an alternate source.
- Agricultural acreage is projected to increase by 13,400 acres from 2005 to 2025. Overall, agricultural water use is projected to increase by about 17 MGD.
- Traditional water sources include fresh groundwater from the Surficial Aquifer System (SAS) and Intermediate Aquifer System (IAS) and surface water, primarily from the Caloosahatchee River.
- The LWC Planning Area has long been a leader in alternative water supply projects. Currently, brackish water sources provide about 40 percent of the area's public potable water supply, and reclaimed water use (reuse) is over 90 percent of the wastewater flow for the area.
- Alternative water sources include reclaimed water, surface water captured during wet-weather flows, aquifer storage and recovery (ASR) and surface reservoirs, and brackish surface and groundwater.

PLANNING PROCESS

As mentioned earlier, the process for development of the 2005–2006 LWC Plan Update incorporated extensive public participation, including nine public workshops, as well as coordination with local governments, adjoining water management districts, and other state and federal agencies. A review of previous planning efforts in the region and documentation of activities since the approval of the 2000 LWC Plan were a key starting point of this process. Planning efforts integrated development of 2025 demand projections, assessment of existing and projected resource conditions, and formulation of strategies to meet urban, agricultural and environmental water needs.

Using the 2000 LWC Plan as a foundation, this water supply plan update involved collecting the latest information about water resources, rainfall, natural resources, water demands, water conservation and land use. Analyses, such as groundwater and surface water evaluations, regulatory information, mapping, wetland studies and other related data, confirmed the validity to previously identified issues and helped identify new issues that may have emerged.

The next phase of the planning process consisted of modifying existing solutions or developing new solutions to address the identified issues. In areas where projected demands exceeded available supplies, solutions included use of alternative water supplies and water conservation. Each water source option was evaluated, and local and regional responsibilities were identified.

In order to expedite the Water Protection and Sustainability Program as directed by the legislation in 2005, the District requested water users and suppliers to complete project questionnaires identifying water supply projects intended to meet water needs for the next 20 years. This project information was compiled and evaluated by the District, with input from stakeholders, and was used to create **Chapter 7: Water Supply Development Projects**, which evaluates existing and proposed supplies relative to projected future water demand.

ACCOMPLISHMENTS

In preparing the 2000 LWC Plan, the planning process analyses identified key regional issues. These included surface water availability; limits on expanding the Surficial Aquifer System (SAS) and Intermediate Aquifer System (IAS); the water quality of the Floridan Aquifer System (FAS); discharges from Lake Okeechobee to the Caloosahatchee Estuary; and, saltwater intrusion vulnerability in coastal areas.

To resolve these issues, the 2000 LWC Plan contained 29 recommendations that were organized into the following eight water resource development categories:

- Conservation.
- Groundwater Resources.
- Reclaimed Water.
- Regional Irrigation Distribution System.
- Seawater.
- Storage.
- Surface Water.
- Related Implementation Strategies.

Development of each of these water source options required regional, as well as local involvement, which the 2000 LWC Plan discussed. Accomplishments and activities in each of these eight categories are discussed in the following sections.

Of 29 specific project recommendations in the eight categories listed in the 2000 LWC Plan, 27 were initiated during the plan's implementation, while two recommendations were not implemented. One program that would have provided the District with access to conduct aquifer and water quality testing during drilling of new municipal production wells was not implemented due to liability issues, and the other recommendation (Well Abandonment Program) was replaced with a regulatory program.

The Five-Year Water Resource Development Work Program, contained in the SFWMD's annual *South Florida Environmental Report, Volume II*, annually summarizes

the progress of these recommendations. **Appendix C** tracks all the projects as originally detailed in the 2000 LWC Plan.

Conservation

The 2000 LWC Plan identified the need to develop a comprehensive Water Conservation Program, support existing mobile irrigation laboratories (MILs) and establish additional MIL labs. Coupled with city and county ordinances, the SFWMD adopted year-round conservation measures for landscape irrigation (Rule 40E-24), which became effective in 2003. In addition, the Districtwide campaign regarding landscape irrigation (the “Three-Day-A-Week Watering Plan”) was completed in Fiscal Year 2004. There are five MILs in the LWC Planning Area: one agricultural and four urban. The agricultural MIL and two of the urban MILs are funded by the SFWMD. The potential water savings from the three District-funded LWC MILs for the past five years was 0.9 MGD, with a typical urban MIL performing about 140 evaluations per year. The estimated savings assume that each participant fully implements all of the MIL recommendations.



A Mobile Irrigation Staff Member Teaches Water Conservation to Students

Another District program, the Water Savings Incentive Program (WaterSIP), funded noncapital cost projects for utilities and property owner associations, and participated in 50-50 cost-sharing for projects. The projects included indoor plumbing retrofits, showerhead and toilet replacements, and outdoor irrigation retrofits, such as rain sensors. Between 2000 and 2004, an estimated 147,000 gallons per day (GPD) of water was saved through the WaterSIP in the LWC Planning Area at a cost of \$160,000 to the District.

The conservation effort has been strongly supported by local governments and represents a major accomplishment of the 2000 LWC Plan.

Groundwater Resources

The 2000 LWC Plan addressed the SAS, IAS and FAS in the LWC Planning Area for monitoring, rulemaking and modeling. Groundwater level and water quality monitoring was expanded between 2000 and 2005. Ongoing monitoring efforts continued in the SAS and IAS, and an additional 23 recorders were installed on SAS wells in Hendry County to evaluate local water level trends. The FAS network was expanded to 12 sites within the LWC Planning Area. Continuous water-level recorders have been installed at these sites, and periodic water quality assessments are available.

In addition, the District and U.S. Geological Survey (USGS) cost-shared two investigations of the extent of saltwater intrusion in portions of the LWC Planning Area. **Chapter 4** summarizes the findings of these studies under the heading, “Multiple Issues Limit New Traditional Supplies.”

Surface and groundwater models for this region are being implemented. Two hydrologic subregional models, the Surficial Aquifer System Model and Floridan Aquifer System Model, have been calibrated and will undergo independent scientific peer review in 2006 before becoming available for use by District staff or stakeholders.

Reclaimed Water and Regional Irrigation Distribution System

The 2000 LWC Plan recommended reclaimed water systems be connected to form a regional irrigation system (RIDS), which led to a District-sponsored feasibility study. The LWC Planning Area continues to be a leader in the state, with 21 of 22 wastewater facilities producing or distributing reclaimed water. In 2004, the LWC Planning Area reused 93 percent of treated wastewater, or 72 MGD.

The RIDS Feasibility Study evaluated the potential development of regional irrigation water distribution systems and other options to meet the growing urban irrigation demands of the LWC Planning Area. Accordingly, the objective of the study was to develop preliminary design information for an interconnected irrigation system that would maximize the use of nonpotable water to meet all or a portion of the projected Year 2020 urban irrigation demand.



Construction of Regional Reclaimed Water Treatment Facility

The RIDS Project included three phases: Phase 1, Feasibility Analysis (completed in 2002); Phase 2, Subregional Analyses (completed in 2004); and, Phase 3, Implementation (which began in 2004). Implementation is being conducted by individual utilities with financial support provided through the District’s Alternative Water Supply Grant Program.

The RIDS study area was divided into three subregions, and an inventory of potential alternative sources of supply was identified and prioritized. These preferred projects included reclaimed water/ASR (contingent upon regulatory considerations), surface water/ASR (contingent upon regulatory considerations) and other systems. Of the 32 identified projects, 28 involved aquifer storage and recovery (ASR) and four involved interconnects. It was estimated that these projects could provide up to 221 MGD of urban irrigation water by 2020 at an estimated total capital cost of \$208 million.

Seawater

The 2000 LWC Plan identified the option of using seawater from the Gulf of Mexico as a raw water source. The plan concluded that seawater is a potential future supply source, but in 2000, was not cost-effective.

However, the District and Florida Power & Light (FPL) jointly funded a feasibility study to investigate the potential of co-locating a water treatment plant with an electric generating station using saline water for cooling purposes. The study assumed reverse osmosis (RO) as the treatment technology and identified two FPL plants, one in Fort Myers and another in Fort Lauderdale, as having the best potential for development of a water treatment plant. The Seawater Desalination Study is currently being updated.

Storage

Recommendations in the 2000 LWC Plan recognized three types of potential storage options and the goals associated with each option: ASR, regional and local retention projects, and reservoirs.

Aquifer storage and recovery is the underground storage of injected water into an acceptable aquifer during times when water is available and the subsequent recovery of this water during high-demand periods. The District continued to work with other government agencies on water quality requirements and rulemaking to address the use of the FAS for ASR and water use. Of the 28 existing ASR wells in the SFWMD, 14 are located in the LWC Planning Area, including six operational ASR wells, seven wells in operational testing and one inactive ASR well.



Aquifer Storage and Recovery
Drill Rig

Regional and local retention projects increase water availability and evaluate injection of surface water and other sources for saltwater intrusion barriers. The Big Cypress Basin, which encompasses all of Collier County and part of Monroe County, completed four retention projects, creating 365 acre-feet of additional annual retention volume.

Surface Water

Recommendations in the 2000 LWC Plan included projects to use surface water as a supply source. These projects include the Caloosahatchee River (C-43) Basin ASR Pilot Project, the C-43 (Caloosahatchee River) West Reservoir Project, the Southwest Florida Feasibility Study (SWFFS), and the establishment of minimum flows and levels

(MFLs) for the Caloosahatchee River and Estuary. The Caloosahatchee River Basin ASR Pilot Project is a component of the Comprehensive Everglades Restoration Plan (CERP). The C-43 (Caloosahatchee River) West Reservoir Project is one of the District's Acceler8 projects. Acceler8 is a program to build high-priority CERP projects.

The Caloosahatchee River ASR Pilot Project was designed to address the technical and regulatory uncertainties regarding regional implementation of ASR projects. The C-43 West Reservoir Project is a component of a larger restoration project for the Caloosahatchee River and Estuary that will capture water from the Caloosahatchee River (C-43) during high-flow times for storage and dry-season use. A location has been acquired in Hendry County to construct a reservoir for 170,000 acre-feet of storage—which is approximately the equivalent of 79,000 Olympic-sized swimming pools—averaging 20 feet deep. Construction of test cells was completed in 2006. Full construction activities are scheduled to begin in the summer of 2007 and slated to finish late in 2010.



Caloosahatchee River/C-43 Canal

The U.S. Army Corps of Engineers (USACE) and the SFWMD are conducting the SWFFS, which will develop a water resources plan for the entire southwest Florida area. The study will also provide for ecosystem and marine/estuary restoration and protection, environmental quality, flood protection, water supply and other water-related purposes. It is anticipated that this study will be completed by 2008.

Related Implementation Strategies

Related implementation strategies include recommended rulemaking and regulatory efforts that applied to several of the future source options from the 2000 LWC Plan, or those that could not be associated with a specific source option.

Consumptive use permitting rules were revised regarding the 1-in-10 year level of certainty, resource protection criteria, water shortage triggers, saltwater intrusion, special designations and permit duration. The rules were revised and approved in 2002 and 2003 and included revision of the District's *Basis of Review for Water Use Permit Applications* (SFWMD 2003), which requires that withdrawals of water must not cause adverse impacts to environmental features that are sensitive to magnitude, seasonal timing and duration of inundation.

The SFWMD established a MFL for the Caloosahatchee River and Estuary in 2000. This rule established a minimum flow of 300 cubic feet per second (cfs) at the

Franklin Lock and Dam, or S-79 Structure, on the Caloosahatchee River in order to protect downstream submerged aquatic vegetation communities from significant harm. The MFL Rule recognized that the minimum flow could not be consistently met and identified specific CERP projects as a recovery plan. An update of the Caloosahatchee River and Estuary MFL was initiated in 2003. Minimum flows and levels are further discussed in **Chapter 3**.

In 2001, MFLs were also established for three aquifers in the LWC Planning Area, including the Lower Tamiami, Sandstone and Mid-Hawthorn aquifers. The established MFLs for each were the structural top of the aquifers. In addition, maximum developable limits (MDLs) were established 20 feet above the top of these confined aquifers to ensure that water levels do not reach the MFLs.

WATER SUPPLY PLANNING FOR THE NEXT 20 YEARS

To determine the water supply needs of the LWC Planning Area for the next 20 years, establishing baseline and projected water use information is part of the planning process. **Chapter 2** presents the demand estimates and projections by water use category.